

REMARKS

I. Introduction

In response to the pending Office Action, Applicants have amended claims 107 and 108 in order to further clarify the subject matter of the present invention. Support for the amendment to claims 107 and 108 may be found, for example, on page 26, lines 31-32 and page 29, line 3-5 of the specification. No new matter has been added.

For the reasons set forth below, Applicants respectfully submit that all pending claims are patentable over the cited prior art.

II. The Rejection Of Claims 107-108 Under 35 U.S.C. § 102 and 103

Claim 107 was rejected under 35 U.S.C. § 102(b) as being anticipated by Fuller et al. (USP No. 6,068,941) and claim 108 was rejected under 35 U.S.C. § 102(b)/103(a) as being anticipated by or alternatively unpatentable over Dine et al. (US 2002/0098393) and Ueno et al. (US 2001/0001287). Applicants respectfully traverse these rejections for at least the following reasons.

With regard to the present invention, claim 107 recites a method for operating a fuel cell comprising an electrolyte, an anode and a cathode sandwiching the electrolyte, and one pair of separator plates each having a gas flow path for feeding and discharging a fuel gas to the anode and for feeding and discharging a fuel gas to the anode and for feeding and discharging an oxygen-containing gas to the cathode, the method comprising a step of carrying out a restoring operation by supplying a hydrocarbon gas that is a city gas desulfurized with a desulfurizer, a propane gas or a butane gas to the cathode to replace oxygen to decrease a voltage of the cathode, after terminating operation of the fuel cell.

It is alleged by the Examiner that an alcohol is a hydrocarbon. He supports this allegation by using the definition of “alcohol” found in Merriam-Webster’s Collegiate Dictionary (10th Ed.) which states that an alcohol is a compound that has hydroxyl derivatives of hydrocarbons. The Examiner then makes an improbable leap by stating “therefore, the ethanol or methanol of Fuller is a hydrocarbon-*based* or hydrocarbon-*derived* material, and as such it reads on applicant’s broad hydrocarbon substance.” However, this reasoning is legally and factually incorrect.

Applicants do not argue that an alcohol may be derived from a hydrocarbon. However, nowhere in claim 107 is there ANY language that states “hydrocarbon-based or hydrocarbon-derived”. The claim clearly and explicitly states “hydrocarbon gas”.

Moreover, derivatives of a substance are by definition NOT that substance. Merriam-Webster’s Collegiate Dictionary 10th Ed. defines derivative as **a**: a chemical substance related structurally to another substance and theoretically derivable from it **b**: a substance that can be made from another substance. Thus, by using the Examiner’s own definition of alcohol from the Examiner’s own reference, the Examiner has proved conclusively and unequivocally that an alcohol is NOT a hydrocarbon.

As stated before, hydrocarbons are organic compounds consisting exclusively of the elements hydrogen and carbon (see, page 612, Hawley’s Condensed Chemical Dictionary, 12th Ed.). In Houghton-Mifflin’s Online Dictionary, the definition of “exclusively” means “Excluding or tending to exclude: *exclusive barriers*. Not allowing something else; incompatible: *mutually exclusive conditions*. Not divided or shared with others: *exclusive publishing rights*. Not accompanied by others; single or sole”. A hydrocarbon-*based* or hydrocarbon-*derived* compound

that has anything other than hydrogen and carbon is NOT a hydrocarbon. Applicants submit that it could not be more abundantly clear that an alcohol is NOT a hydrocarbon because hydrocarbons ONLY have hydrogen and carbon. Hence the name “hydrocarbon”.

As such, not even the broadest interpretation of the term “hydrocarbon” would include alcohols. Moreover, no skilled artisan would ever interpret an alcohol as a hydrocarbon. The myriad of differences in physical and chemical properties would prevent even the most inexperienced chemist or engineer from making this error. Accordingly, as it is clear that Fuller does not teach a step of supplying a *hydrocarbon gas* to the cathode, it is even more abundantly clear that Fuller fails to teach a step of supplying a hydrocarbon gas that is a city gas desulfurized with a desulfurizer, a propane gas or a butane gas to the cathode, as recited in amended claim 107.

Turning to claim 108, amended claim 108 recites a method for operating a fuel cell comprising an electrolyte, an anode and a cathode sandwiching the electrolyte, and one pair of separator plates each having a gas flow path for feeding and discharging a fuel gas to the anode and for feeding and discharging a fuel gas to the anode and for feeding and discharging an oxygen-containing gas to the cathode, the method comprising a step of carrying out a restoring operation by supplying water to the cathode to replace oxygen to decrease a potential of the cathode to + 0.1 V to + 0.4 V with respect to a potential of the anode, after terminating operation of the fuel cell.

The significance of this decrease in a potential of the cathode is that it results in an advantage that the deterioration due to oxidation of the catalyst and adsorption of contaminants

can be resolved (see, page 25, lines 3-6 of the specification). Thus, the replacement of oxygen at the cathode is one beneficial aspect of the present invention.

In contrast to the present invention, Ueno discloses a method of starting a fuel cell in which after oxygen (air) is supplied to a cathode, the fuel cell is started while supplying water to the cathode. According to this method, both oxygen and water are supplied to the cathode. Furthermore, Dine discloses supplying hydrogen and oxygen to the cathode. In contrast, as stated above, the present invention in amended claim 108 supplies water to the cathode to replace oxygen. If the oxygen is not replaced by the water, the potential of the cathode will be approximately +1.0V, that is near an open circuit voltage with respect to a potential of an anode. As such, it would not be possible to decrease the potential of the cathode to the claimed range of +0.1V to +0.4V with respect to the potential of the anode under the conditions used in Ueno and Dine. As such, Ueno and Dine fail to teach or suggest amended claim 108 of the present invention.

Anticipation under 35 U.S.C. § 102 requires that each element of the claim in issue be found, either expressly described or under principles of inherency, in a single prior art reference, *Kalman v. Kimberly-Clark Corp.*, 713 F.2d 760, 218 USPQ 781 (Fed. Cir. 1983), and in order to establish *prima facie* obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. *In re Royka*, 180 USPQ 580 (CCPA1974). At a minimum, Ueno, Fuller and Dine do not disclose a method for operating a fuel cell comprising an electrolyte, an anode and a cathode sandwiching the electrolyte, and one pair of separator plates each having a gas flow path for feeding and discharging a fuel gas to the anode and for feeding and discharging a fuel gas to the anode and for feeding and discharging an oxygen-containing gas to the cathode, the method comprising a step of carrying out a restoring operation by supplying a hydrocarbon

gas that is a city gas desulfurized with a desulfurizer, a propane gas or a butane gas OR water to the cathode to replace oxygen to decrease a potential of the cathode to + 0.1 V to +0.4 V with respect to a potential of the anode, after terminating operation of the fuel cell. As such, it is clear that Ueno, Fuller and Dine, alone or in combination, do not anticipate, nor render obvious, claims 107 and 108 of the present invention.

III. Conclusion

Having fully responded to all matters raised in the Office Action, Applicants submit that all claims are in condition for allowance, an indication of which is respectfully solicited.

To the extent necessary, a petition for an extension of time under 37 C.F.R. 1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account 500417 and please credit any excess fees to such deposit account.

Respectfully submitted,

McDERMOTT WILL & EMERY LLP



Michael E. Fogarty
Registration No. 36,139

600 13th Street, N.W.
Washington, DC 20005-3096
Phone: 202.756.8000 MEF/NDM:kap
Facsimile: 202.756.8087
Date: October 5, 2007

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as our correspondence address.**